THE TROUGHS OF THE WESTERN PACIFIC OCEAN

The new record sounding of 32,114 feet [1] in the central part of the Philippine Trough, which was reported in the *Bulletin* last year (Vol. 44, p. 611), leads Dr. W. Krebs, of the Meteorological Observatory of Schnelsen, near Hamburg, to discuss the troughs of the western Pacific in general and their structural significance (*Geogr. Zeitschrift,* Vol. 19, 1913, No. 3, pp. 161–163, and *Deutsche Rundschau für Geogr.,* Vol. 35, 1912–13, No. 3, pp. 123–124; both with maps).

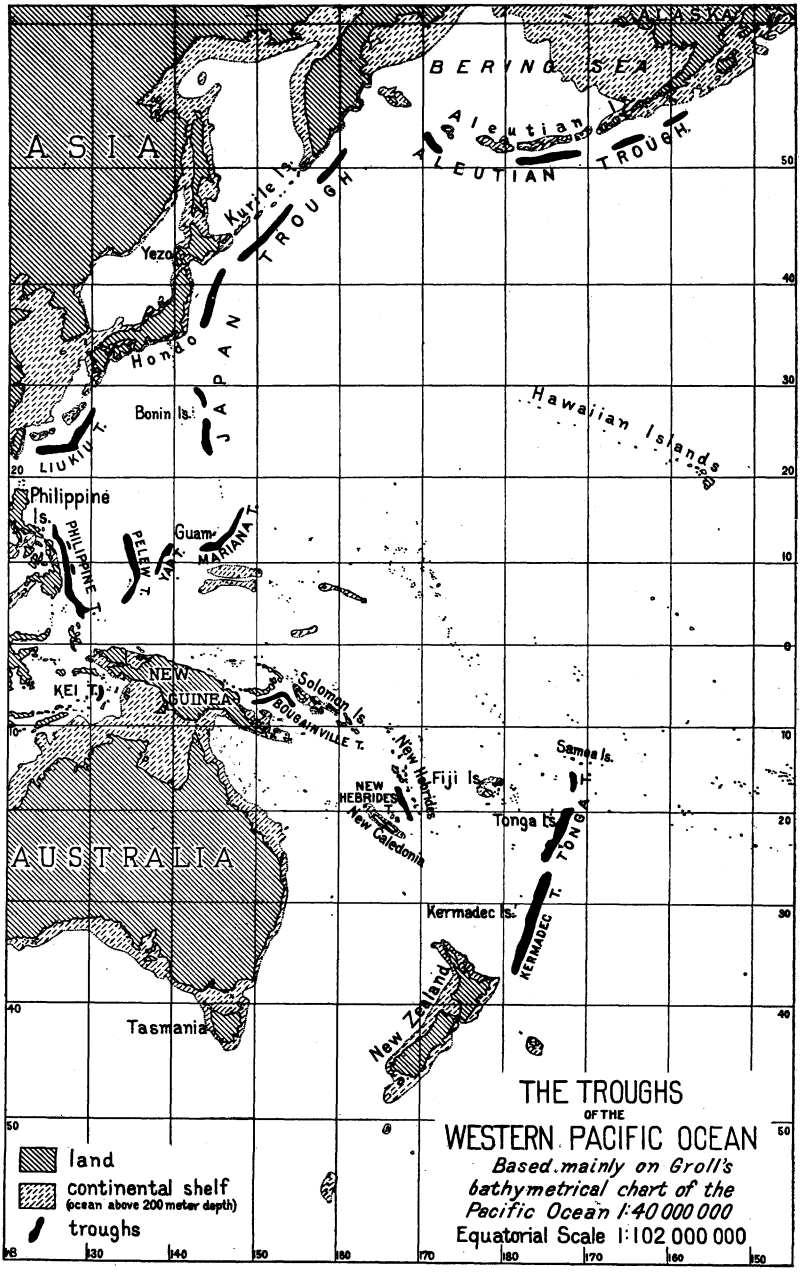
If, with Suess, we count Alaska as belonging structurally to Asia (*Bulletin,* Vol. 42, 1910, p. 179) we can distinguish no less than twelve troughs in the western (Asiatic) Pacific, which vary between 24,000 and 32,000 feet in depth. They may be considered to be aligned in two series, an outer and an inner one (with reference to Asia). With the exception of three they all lie on the convex side of the island festoons which border the eastern side of Asia.

To the outer series belong the following, beginning on the north (cf. the map): the Aleutian Trough, paralleling the Aleutian Islands on the south; the Japan Trough, which extends along the outer side of the Kuriles, of Yezo and Hondo, and of the Bonin Islands; the Mariana Trough, along the outer side of the southern end of the Mariana group (with the depth, southeast of Guam, of 31,614 feet sounded in 1899 by the U. S. S. *Nero,*[2] which, up to the record sounding in the Philippine Trough was the greatest known oceanic depth); the Yap Trough and the Pelew Trough, east of the islands of that name; and, at a long interval, the Tonga Trough and the Kermadec Trough, extending together for 1,500 miles along the eastern side of the islands of that name from Samoa to New Zealand.

The inner series of troughs consists of the following: the Liukiu Trough, along the outer side of the Liukiu Islands between Japan and Formosa; the Philippine Trough, skirting mainly the coast of Samar and Mindanao; then the three troughs which exceptionally lie on the concave side of the island arcs they accompany, *viz.,* the Kei Trough, on the inner side of the islands encircling the Banda Sea, the Bougainville Trough, along the south side of Neu Pommern

[1] 9,788 meters, not 9,780 meters, or 32,088 ft., as first reported; see *Ann. der Hydrogr.,* Vol. 40, 1912, No. 11, p. 610.

[2] See *Bull. U. S. Natl. Museum No. 55,* pp. 4 and 51.


ALASKA
BERING SEA
ASIA
Aleutian
ALEUTIAN TROUGH
Kurile Is.
TROUGH
Yezo
Hondo
JAPAN
Bonin Is.
Hawaiian Islands
LIUKIU T.
Philippine Is.
PHILIPPINE T.
Guam
MARIANA T.
PELEW T.
YAP T.
NEW GUINEA
KEI T.
Solomon Is.
BOUGAINVILLE T.
New Hebrides
NEW HEBRIDES T.
New Caledonia
Fiji Is.
Samoa Is.
Tonga Is.
TONGA T.
AUSTRALIA
Kermadec Is.
KERMADEC T.
Tasmania
New Zealand
land
continental shelf
(ocean above 200 meter depth)
troughs
THE TROUGHS
OF THE
WESTERN PACIFIC OCEAN
Based mainly on Groll's
bathymetrical chart of the
Pacific Ocean 1:40 000 000
Equatorial Scale 1:102 000 000

of the Bismarck Archipelago and the southwest side of Bougainville Island of the Solomon Archipelago, and, finally, the New Hebrides Trough, extending along the western side of the New Hebrides group, between it and New Caledonia.

The distribution of these troughs parallel to the great zones of crustal folding along the eastern border of Asia points to the probability of their origin being due to faulting on a large scale. Confirmation of this view and evidence of the present continuation of these deformational movements is deduced by Dr. Krebs from the recent soundings made in the Philippine Trough. Bottom samples from the southern part of this trough conclusively prove the volcanic nature of these deposits. This is entirely in keeping with the frequency of seismic activity during 1903–1911 in the eastern part of Mindanao, parallel to the coast of which, as has already been mentioned, lies the southern part of the Philippine Trough. The most severe of these disturbances, that which occurred in the Agusan Valley on July 12, 1911, was, to be sure, mainly due to slipping along the fault which this valley follows. However, this tectonic movement is directly traceable to disturbances in the Philippine Trough itself, as it was here that the registrations of various European seismographs located the epicenter of this earthquake, and not on land. Dr. Krebs even does not consider it improbable that the record depth of 32,114 feet sounded by the *Planet* on July 2, 1912, had just come into existence, either during the earthquake of July 12, 1911, or during an earlier severe shock which occurred on March 18, 1909.

W. L. G. J.